G. A. Shufeldt

History of the Chicago artesian well.

HISTORY

OF THE

Chicago Artesian Well.

A DEMONSTRATION OF THE TRUTH OF THE SPIRITUAL PHILOSOPHY: WITH AN ESSAY ON THE ORIGIN AND USES OF PETROLEUM.

BY GEO. A. SHUFELDT, JR.

FIFTH EDITION.

CHICAGO:
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1866.

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CHEMICAL ANALYSIS

OF THE

Artesian Well Water,

By DR. MAHLA.

CHICAGO, December 27th.

MR. SHUFELDT:

Dear Sir: I send herewith the result of a chemical examination of the sample of water which was transmitted to me by you, as coming from the Artesian Well. A gallon of this water holds 71 72-100 Troy grains of solid mineral substances in solution. They consist mainly of carbonate of lime and carbonate of magnesia, with smaller proportions of sulphate of lime and sulphate of magnesia, chloride of magnesium, very little chloride of sodium, and traces of alumni and silicic acid.

Owing to the mineral ingredients which it contains, it deserves the name of a ("temporary") hard water. I found it, contrary to the prevailing opinion, free of sulphuretted hydrogen. It is beautifully clear and transparent, and therefore most admirably adapted for drinking purposes.

I am yours, very respectfully,

DR. F. MAHLA, Practical Chemist.

HISTORY

OF THE

CHICAGO ARTESIAN WELL,

A DEMONSTRATION OF THE TRUTH OF THE

This Edition of this History contains an account of the successful boring of the Second Well—with a diary of the mechanical part of the operations, and some other matters of general interest. Each future edition will contain accounts of the general progress and development of the work.

CHICAGO:
RELIGIO-PHILOSOPHICAL PUBLISHING ASSOCIATION.
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MR. SHUFELDT:

Dear Sir: I send herewith the result of a chemical examination of the sample of water which was transmitted to me by you

drawing under glass in this country, and of the Artesian Wells Mammoth Ice House—the originals of which were executed through the mediumship of the undersigned—can be had by addressing

A. JAMES,

Box 2079, Chicago.

HISTORY

OF THE

CHICAGO ARTESIAN WELL,

A DEMONSTRATION OF THE TRUTH OF THE

SPIRITUAL PHILOSOPHY,

WITH

AN ESSAY ON THE ORIGIN AND USES OF PETROLEUM.

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PREFATORY.

This work, as a Spiritual demonstration, has become known throughout our entire country, and a great degree of curiosity has been manifested to learn the manner in which the revelation of the existence of water and oil beneath this ground was made. To gratify in a measure this curiosity, and to contribute —only a mite perhaps—to the great mass of facts now rapidly accumulating in support of the truth of Spirit communion, the following details are given. They are vouched for by the writer, so far as his personal knowledge goes; and those matters of which he is not cognizant are testified to by reliable witnesses to that extent which admits of no possible contradiction. It has heretofore been a common practice to sneer at and ridicule such new truths and developments as were not comprehended by the ordinary understanding of men; but it will not do in this day, and after the demonstrations of the Steam Engine, the Locomotive, Hoe's Press, the Magnetic Telegraph and the Telescope, to repudiate anything for the single reason that it is new and not generally understood. There are things in Philosophy and Science every day revealed which cannot be laughed down nor sneered out of existence; and with all due respect to the men of learning and the wise ones of the world, I venture to suggest that this fact of the Spirit communion is one of that class. The daily accumulation of proofs is too great, the mass of testimony in its favor is too strong, to permit any mere passer-by to laugh it down;—like Banquo's ghost, "it will not down"—but is ever, with its simple philosophy, with its Divine justice and morality, rising upward and marching onward; numbering its followers by millions; attracting the simple and lowly of the world as well as the

learned and the great; uprooting Atheism, Deism and Pantheism; it destroys that skepticism and infidelity to God, which have cast so many shadows on the natural religion of man.

The facts detailed in the following pages—"The History of the Chicago Artesian Well"—are given and intended as mere links in the great chain of proofs, to demonstrate the reality of the Spiritual communication. The revelation of the existence of water and oil underneath this ground, where geologists declared they did not exist, and the proof of the truth of that revelation, by actual boring into the ground, the result of which can now be seen by all, in the perpetual, never-ending flow of this splendid fountain, is the great fact to which we point, as conclusive proof of the matters which are here alleged.

It was sometime in the summer of 1863—in July or August—two gentlemen from Maine, Mr. Thos. J. Whitehead and Mr. A. E. Swift, visited Chicago on private business of their own. They were strangers here, ignorant of Chicago, its soil, surface and surroundings, and bent wholly upon matters foreign to the subject and substance of this narrative.

These gentlemen happened to be of the Spiritual faith, and met many times in a circle formed by themselves, Mrs. Caroline Jordan, a writing medium, and Mr. Abraham James, hereafter referred to. The meetings of these persons and the holding of circles were, apparently, accidental, and without any particular designs other than those which usually attend such gatherings, and attention was first attracted by a communication in writing given through Mrs. Jordan—that a matter of great importance and significance would soon be made known; and, in pursuance of this intimation, it was shortly thereafter written, with an explanatory preface, to the effect that great doubts prevailed in the human mind as to the reality and truth of the spiritual communion, many per-

sons altogether disbelieving in the existence of any of the alleged phenomena; hence, a practical test or demonstration was necessary, in order to remove these doubts and to place this fact beyond the possibility of cavil or dispute; and then the revelation came: *That beneath a certain tract or piece of land, near the city of Chicago, Petroleum existed in large quantities*, and could be obtained by the ordinary process used for that purpose. And it was further declared and stated that underneath this ground would also be found a well or stream of the best, purest and healthiest water known anywhere, which would rush to the surface with great force and power, and was in quantities sufficient to supply the people of this city for all time to come, and that this water would be found and used for that purpose. No very great degree of attention was paid to these statements until after many earnest repetitions of the same story *and a specific location of the land was made.* The medium, Mr. James, was taken to the ground, was there entranced, and, in that state, selected a point for boring the first well; and at that precise spot this well is now flowing 600,000 gallons per day of the best and purest water in the world.

About the time of the occurrence of these matters, my attention was called to it by Messrs. Whitehead and Swift, but not then understanding the object of the communication, and thinking that it was a mere search after money, which I knew was never sanctioned by spirits of truthful character, I declined to have anything to do with it, and for the time paid no further attention to it. But, as these gentlemen were persistent in their efforts and evidently honest in their faith, I was finally induced to attend the circle, which I did for the purpose of learning more definitely the character of the communications and the probable truthfulness of

the matters referred to—and here, for the first time, I heard this revelation in full, and its objects and purposes explicitly stated, and being convinced that such objects and purposes were for the accomplishment of a great good, negotiations were opened for the purchase of the land. This purchase being consummated in the month of October, 1863, the drill was shortly thereafter started, in pursuit of the facts which had been thus revealed. The one fact—the water—has been found; the other will come in due season.

Many times during the progress of the work—I may say many hundreds of times—these things were repeated and insisted upon by different spirits through the same medium. A diagram was made showing the location of the water, and the workmen were advised to be on the lookout for it only one or two days before it was finally reached. As to the existence of oil beneath this ground, we who have carefully watched the descent of the drill and studied its products, have no doubt of the fact—for we see it every day and every time the sediment comes to the surface. We were told that the oil was to be found in quantities below this water some fifty or sixty feet, and, when the proper time arrives, we shall demonstrate the truth of this assertion, or prove its falsity. At present our business is with the water, and our efforts are directed to the one result, *i. e.*, to make this the largest and most magnificent fountain of pure cold water to be found anywhere in the world.

It has been, also, frequently stated, through the medium, that the Petroleum and gases from this ground, and their products, would be used for the purpose of illuminating the streets and houses of this city, but as this statement may seem extremely problematical to many, I simply give it as it came, and leave the future to prove or disprove it.

THE CHICAGO

ARTESIAN WELL.

A DEMONSTRATION OF THE TRUTH OF THE SPIRITUAL PHILOSOPHY.

The history of this work may be briefly written:

In December, 1863, the boring was commenced, with a diameter of five inches. In January following, the well was lost at a depth of sixty-five feet — the tools getting fast at the bottom. Another was commenced in February, 1864, and the work progressed slowly and gradually until November, when the water was struck, at a depth of seven hundred and eleven feet. And this water is now flowing to the surface, with a head of about eighty feet. There are no striking geological peculiarities found in this boring.

The alluvial formation or deposit around Chicago is about one hundred feet in depth; at this particular point, however, by a natural upheaval of the earth's crust, the rock is thrown to the surface, so that, instead of sinking the usual soil-pipe, common to the boring of Artesian wells, the drill was started in the rock itself directly from the surface; and, with a single exception, the boring was continued through the rock all the way down

At the surface, this rock is the upper stratum of the upper silu-

rian, the formation in this part of the State being usually in the Devonean. The first thirty-five feet is limestone, saturated with and greatly discolored with petroleum to such an extent that the rock will burn as freely as coal; and frequently, in blasting, petroleum in quantities of one or two gallons have been thrown out with a single charge of powder. Immediately underlying this is a stratum of what we call here Joliet marble, one hundred feet in thickness. This is one of the very best building stones in existence, and many of the public buildings in Chicago are constructed from it. It crops out at Athens and Joliet, about thirty or forty miles from here, at which places it is obtained for use.

Below this marble lies a stratum of conglomerate of sand and flint about one hundred and twenty-five feet in thickness. This band was marked by the occasional presence of iron pyrites, and with one trace of copper. The drill went through it very slowly. Wherever crevices appeared in this rock strong indications of oil were found. Beneath this conglomerate we entered the shale, a blue clay or unformed rock, which separates the upper and lower silurians. This band is one hundred and fifty-six feet thick, characterized by no special peculiarities. We met with nothing but a few bushels of nodules, or more perfectly formed shale, which occasionally dropped into the well; but this entire band was saturated with petroleum, the sediment coming up like putty, thick and greasy. A test by distillation afforded a small quantity of oil, and naptha in abundance. Gas now began to escape and signs of oil were abundant. After this the drill penetrated the upper surface of the Galena limestone; and where this shale rests upon the underlying rock, at a depth of five hundred and twenty-seven feet, the largest quantiy of oil yet seen was found. The drill and drill rods were covered so thickly that the oil ran from them in considerable quantities.

At five hundred and thirty-nine feet the first regular band of sandstone was entered, and here again oil was visible in quantities sufficient to produce satisfaction. This sandstone is seventy-one feet thick, and shows oil through the entire stratum. At six hundred and eight feet another band of limestone containing flint and sulphurets of iron was struck. It was very hard, and the progress through it slow.

At this point the well was in constant commotion from the action of escaping gasses—the water at times fell thirty and sixty feet and then suddenly rose to the surface. Shortly after this the water commenced overflowing the well. The quantity was small, but sufficient to carry up with it the sediment from the bottom, and hence from this point, the chippings of the drill being washed away and lost, we had nothing by which to determine anything further in relation to the geological formation. The drill continued to go down until, at the depth of seven hundred and eleven feet, the arch of the rock was penetrated, and the water suddenly burst forth. This was about the 25th of November, 1864. The water flows at the rate of about six hundred thousand gallons per twenty-four hours, through an orifice four and a quarter inches in diameter at the bottom. The temperature is 58° F. and is uniform. It is clear as crystal, as pure as the diamond, free from all animal or vegetable matter, and from any injurious mineral substances, and its composition is such that it is better adapted for drinking purposes, and for health, than any other water known.

Taking into account the low temperature of this water, the great depth from whence it comes, its head, or the force with which it comes to the surface, and the quantity discharged, it may be said to be the finest Artesian well in the world. There is no well known which discharges so large a quantity of pure healthy cold water. There is one well—that of Passy, near Paris—of

large bore, which furnishes more water; but it is warm, and can only be used to supply the lakes in the Bois de Boulogne, and for irrigating purposes. The water of the well of Grenelle, also, is unfit for other than mechanical uses, and this is true of the majority of deep wells in this country.

Immediately after reaching this water, we proceeded to tube the well through the thirty-five feet of surface rock, which was much broken by the commotion and upheaval. To that end a four-inch pipe was inserted and driven down forty feet, until it reached the solid marble. This tube, or pipe, is now carried twenty-five feet above the surface, and out of the top of this pipe the water flows into a flume, and is conveyed to the water wheel, twenty feet in diameter, which is used as power to drive the drills and machinery for other wells which are now in process of construction.

We have a power which is as near perpetual motion as can be got. The water flows on and on in undiminished force and undiminished quantity—the water flows and the wheel revolves. We are now engaged in boring a well, which, when completed, will be fifteen inches in diameter, and will discharge ten and a half millions of gallons per day. When that is done, we shall rim out the other well to the same diameter, and will then have a quantity of water equal to twenty millions of gallons per day.

It is the object and intention of this work to supply the city of Chicago with pure and wholesome water. We can do it at one-half of the cost of the present method, and then we shall have the great advantages—

1st. That neither expensive engines nor fuel is required; there is no labor; no work; no machinery. It will flow into the reservoir with a force and power which steam engines and force pumps cannot expect to equal.

2d. It can be done at one-half of the cost to the poor man which the present method entails.

3d. The water is perfectly, chemically pure — free from all animal and vegetable matter—and consequently not obnoxious to the charges of disease and death which now lie at the door of the present Chicago Water Works. When this water is once in common use, erysipelas, boils, and eruptive diseases, will disappear, and that bane of our Western cities, low typhoid fever, will be abated in Chicago. The advantages which attend upon this present comparatively insignificant well of water are too great to be reported here. Let it be sufficient to say, that there is in the not distant future blessings connected with it which cannot be paid for in dollars, nor rendered in detail upon paper.

This living well of water will be the poor man's friend for all time to come, and the doctors enemy for eternity.

BORING FOR OIL.

Shortly after reaching the water, as above described, we sunk another well, to the depth of about forty feet, for the purpose of finding oil. This well will eventually go down to the depth of fifteen hundred feet, if necessary; but at present it is stopped to test the surface rock and see if any oil can be obtained from it. This well has been pumped for about three weeks, and about seventy-five to one hundred gallons of Petroleum secured. But this surface stratum of fossiliferous limestone, before mentioned as being saturated with Petroleum, is so broken and distorted by the upheavals that it seems to be impossible to exclude the surface water and produce a vacuum below so as to draw the oil into the well from the seams and crevices. That oil exists here, and can, with perseverance, be obtained, there is no manner of doubt; eventually that question will be decided by actual experiment.

LOCATION OF THE LAND.

The tract of land on which this well is located is forty acres in extent, and lies at the city limits of Chicago—at the corner of Chicago and Western avenues—three and one-half miles from the Court House, or center of the city. Buildings of all kinds are gradually approaching it, and the onward course of the great city of the West will soon surround it. The elevation is thirty-one feet above the level of the lake, and is the highest ground within the corporation limits; the water has a head of at least eighty feet above the surface of the ground, giving one hundred and eleven feet above the lake, thus warranting an ample head for all practical and useful purposes.

THE DISCOVERY OF THIS WELL.

Most persons of the present day have heard of the doctrine of Modern Spiritualism. Some, whose educational or other feelings teach them a different theory of religion, treat it with derision and ridicule. Others who do not profess to understand it, but pursue a wiser course, and are content to await the developments of time and experience, neither reject nor adopt that which they cannot explain or understand; there is yet another class who profess to understand what they teach, and can give reasons for their faith, who have adopted the principles of this beautiful philosophy as their rules of conduct in life, and on which they base their knowledge of immortality and the Eternal World. We do not intend to enter deeply into this subject at present, nor to take issue with any person who sees fit to differ with us in the conclusions to which after a careful investigation we have arrived. That is no part of our business now; holding to the broad doctrine

that every man is entitled to the fullest scope in the enjoyment of his religious opinions — that he alone is his own saviour and accountable to God for his own actions—and hence we ask no man to believe as we do, nor to adopt our faith. We may place before him certain facts on which our knowledge is based, and they may be accepted or rejected as may seem to him fit.

True Spiritualism, as it exists in its beauty and purity, and divested of the charlatanry, humbug and imposture, with which knaves and rogues sometimes encumber it, is nothing more nor less than the Philosophy of Life—of your life and mine—Life in the Physical and in the material world, and Life in the Spiritual and the Eternal world—nothing but human existence—here and there.

Many persons doubt, or altogether disbelieve, in the power of the Spirit after leaving its form to communicate with those remaining in the body, while those who believe in the truths of the Spiritual Philosophy know this to be a demonstrated fact, and also know that through this means the great truths of the Life hereafter—the immortality of the Soul and the existence and manner of life of the human spirit—may be learned. Its birth and education on earth, the death of the body, and the passing on of the Spirit to immortality, become facts cognizable to the human intellect and comprehension. It is these facts, viz.: The existence of the Spirit after death, and its consequent immortality—its power to communicate with those still in the body, and from this source and through this means to learn the truths of Immortal life—to which we are now calling the attention of man, and which we hope to demonstrate beyond question or dispute, and so to establish forever that there may be no further cause of contradiction, we desire to make it plain to the mind of every man capable of forming a thought, that his spirit lives always — that when he passes through the dark valley called death it is but the changing of a

garment, not death, but eternal life—that he becomes neither an angel nor a demon—that he is not raised up to an incomprehensible heaven nor cast down into an impossible hell, but that he remains, himself, an existing, individualized spirit, whose future life is development and eternal progress.

While Spiritualism is as old as history, running through the records of all ages, times and people, manifesting itself in one way and another for thousands of years, yet it is only in comparatively modern times—within our own generation—that the Spirit world has been able to make such communications to man as to lead his mind in the right direction in pursuit of that knowledge which is of itself immortality.

These communications, or manifestations, have assumed all conceivable forms and shapes—physical, as table-tippings and movings, ringing of bells, playing on musical instruments, raising persons from the floor, sustaining heavy bodies in the air, and thousands of things of a like character too numerous to repeat in detail; mental, as talking in strange tongues; ignorant men, uneducated women, and little children, delivering discourses on political and scientific subjects with all the freedom of men of great education and wisdom, and displaying a knowledge which is only acquired by men of studious habits and great experience.

Such manifestations have been made for the one purpose, among others, of calling the attention of man to the great truths of life—what he is and what he is to be—that he may understand his existence here and his Immortal life beyond the grave; that darkness, ignorance and bigotry may be dispelled; that superstition may be destroyed, and the light of the new truth be installed in its supreme majesty and glory.

Long and fearfully has the world struggled with ignorance and barbarity; thousands of martyrs to Liberty and Religion have perished on the scaffold or at the stake of fire. Imprisonment

and disgrace were thrust upon Copernicus and Gallileo for the utterance of a simple and sublime Truth. Cranmer perished in the flames, and thousands died under the tortures of the Inquisition, that ignorance might live, and that bigotry might rule with fire and sword. But we thank the Eternal God that these times have passed away—that a new era is inaugurated—that a new light has dawned upon a regenerated world, and no more need man fear a return to the darkness and prejudices of past ages—to dark ignorance and blind bigotry. In our country and our times the fullest scope of religious liberty is the birth-right of every freeman.

Evidences of the truth of the Spiritual Philosophy, of the power of the spirit to communicate with man in the body, have been from time to time submitted to the world—thousands and tens of thousands have heard and seen these proofs, and have believed, until the numbers have been swelled to millions. But there are those who demand a potent physical manifestation of the power of the spirit, so that all men may see and comprehend, and go away believing. For such a purpose, and to all the world, the revelation of the existence of water and oil underneath this ground was made. It was stated by these spiritual intelligences, among many other things, that this, the city of Chicago, was the grand center of population, and the capital of the Valley of the Mississippi, in the heart of a great Continent, whose people were grandly and rapidly rising to greatness and renown; that here were attracted representatives of all nations, tongues and peoples, and hence if a great practical, sensible demonstration of spirit power were made here, intelligence of the fact would spread far and wide over the world, and that all men would come at last to hear of the new truth, and spread the tidings among all mankind. It was farther stated, that the revelation of the existence of water and petroleum near Chicago, and the securing of these

articles would confer everlasting blessings, of a substantial kind, on a great population; would bring health, and life, and light, to the people of this city for all time to come; and would be a perpetual memento and land mark, to which all in the future could look back in testimony of the rise and progress of the New Philosophy.

That there was a quantity of this water amply sufficient to supply the people of this city for all time; that from its far distant source in the Rocky Mountains, away off in the Northwest, Nature has placed a fountain head, and sent the streamlets down far among the rocks and stones of earth, on its mission to bless and help mankind.

That the quality of the water is such as to adapt it admirably to the use of man—it is pure and sweet, and clear as the crystal springs, and possesses a power of invigorating the body not common to any other water known—it is filtered through the sandstones and gravel beds of Earth, and comes to the surface with a surprising force and power; has a head sufficient to elevate it above the highest buildings in the city, and power equal to the largest engines.

Dispensing with expensive fuel, steam pumps, and great engines, it will fill the reservoirs of the city, without cost, in the shortest possible time.

It was further, also, stated, that petroleum, in large quantities, existed underneath this land; that it could and would be obtained and used by the people of this city, for all the purposes to which this article is applied.

The one part of the revelation is fulfilled, the other is yet to come. I have no manner of doubt but that the entire prediction will be fulfilled in letter and spirit; such evidences of the existence of oil have already been obtained as to render it almost certain that the future will demonstrate the truth of the statement.

When boring the water well—as will be seen by referring to previous pages in this narative—oil was obtained in quantities sufficient to warrant the introduction of a pump, had we only possessed a knowledge of the matter which would have enabled us to obtain the oil by the means now in use for that purpose, but we did not have that knowledge, and thus the well went down to the water.

During the past winter, we have bored a well only forty-five feet in depth, in order to test the surface rock for oil; out of this well have been pumped about one hundred gallons of petroleum. But the broken nature of the surface rock, which is characterized by large seams and crevices, prevented the exclusion of the surface water, and the attempt was therefore abandoned, and the well is now being sunk to a lower stratum, to obtain the oil there. During the present year this well will be thoroughly tested, and the result made public.

THE FUTURE OF THIS WORK.

We are now engaged in boring a well for a further supply of water, which, when completed, will be from fifteen to twenty inches in diameter—most probably the latter—and will discharge from ten to seventeen millions of gallons per day. This water will be first used to supply the City Reservoirs and the people of Chicago with this indispensable article, of such a quality as the people of no other city enjoy. A cheap, inexpensive, perennial river, will flow outward to our citizens forever. We shall then apply the water to the making of ice, by constructing a pond of about forty acres in extent, and putting up, in the winter season, from fifty thousand to seventy-five thousand tons of the clearest, purest ice to be found anywhere in the world. Shade

trees and shrubbery will ornament the banks, and walks will be laid all about it, and thus it will be made to serve the double purpose of a Pleasure Lake in the summer time, and an Ice Pond for the winter. The next thing now in contemplation is the erection of a cast iron column, or cylinder, about four feet in diameter and about one hundred feet in hight, to carry this water to the level of its fountain head. From this column it can be conveyed in any direction, and to any place, for use, as a power to drive machinery, for which it is admirably adapted. Paper mills, cotton or woolen factories, can be erected on this ground, and be run with a cheap and lasting power for all time to come. There is, in fact, scarcely a conceivable use to which this power may not be cheaply and advantageously applied.

In the not distant future we shall lay out a pleasure-ground and garden, shade-trees and shrubbery, grass and flowers, fountains, springs, and little lakes, of this crystal water, will ornament and adorn this spot of ground—baths and bathing-houses will be built, and this great gift dispensed on every side with a free and liberal hand.

There is also a promise on record, of the spiritual intelligence who made this revelation, that the main object and design of this work, not being to put money into the hands of one or two or more individuals—nor for the mere accumulation of wealth by particular persons—that the day will come when the funds, to be derived from this source, will be applied to charitable, benevolent and educational purposes, and for the spreading and dissemination of the principles of this simple and beautiful philosophy

That, on this ground, a great and magnificent temple will be reared to the Supreme Intelligence of the universe, whose portals will ever be open to the entire human family, and where all, casting aside the old creeds, forms, and theologies, may enter the vast halls of mind, and learn the eternal truths of God. Free

schools and colleges will grow up about it, in which the children of poverty may enter, and receive that education and instruction which will enable them to advance their condition in life, and to contribute to the general welfare and progress of the country in which we live. Hospitals will be erected for the sick and destitute, and schools of the arts and sciences will be established to promote that intellectual culture which goes so far towards that refinement which is indispensable to a great people.

All of this may seem wild and extravagant to those who have given no thought to the subject; but as the tendency of this seeming extravagance is to contribute to the general welfare of the people, and to the advancement of the public good, the writer, who has given many days and weeks of thought to this and kindred subjects, craves the indulgence of a liberal people. Satisfied in my own mind that all of this and much more will surely come to pass, and that the future of this great work can be comprehended by every person of common intelligence who will devote a little thought to the matter, I do not hesitate to place these anticipations in print, and to make a public record of my own convictions. But a few years, and the story will be told, its truth or falsity known to men.

THE MANNER IN WHICH THESE REVELATIONS WERE MADE.

The method or manner in which communications usually come from the spirit world, are well understood by those who study the philosophy, but not perhaps so well understood by the world at large. Like all other things which the Creator has made, these manifestations are as various and diversified as any. In the earlier times, and when the fact was first brought to the notice of

man, it was by raps, table-tippings, spelling out words by means of the alphabet, and other simple but effectual devices, that the spirit made known its intelligence and its wants. Many persons were brought to a knowledge of the truth of this spirit communion, by this plain and simple method. As man became somewhat familiar with the subject, and the progess of knowledge became more emphatic, the communications assumed other shapes, persons who possessed certain electrical or vital conditions became enabled to write out communications at length — to express thoughts and ideas in a tolerably clear and perspicuous manner, this in a measure depending on the power of the spirit to place the medium under a greater or less degree of control. When the spirit got an absolute control over the medium, the communications were more likely to be clear and intelligible than if the subjection were only partial, in which case the matter communicated partakes of the ideas and thoughts of the medium. Another phase of this phenomenon is that quite as general and common now as either of the others ; it is, speaking the thought and language of the spirit through the medium. When in a state of syncope or trance, unconscious, oblivious to all surroundings, and, as it were, locked fast in sleep, ignorant, uneducated men have been known to speak strange tongues. Men who are familiar with no other language than their mother tongue, have spoken fluently in French, German, Italian, Spanish, Chinese, Arabic, and languages of various Indian tribes. They have delivered discourses on philosophy, religion, astronomy, chemistry, geology, and all the natural sciences, displaying a diversified knowledge which can only be acquired by years of study and thought. There is still another form in which this intelligence has manifested itself, and that is in the arts of drawing and painting. I have seen some most wonderful and beautiful manifestations of this power particularly illustrated in pencil drawings. There is now in Chicago,

in the possession of a gentleman whose name, as I have not requested it, I am not at liberty to use, but who no doubt would cheerfully acquiesce if requested, a pencil portrait of his wife, life-size, with a countenance of most angelic beauty; her hair falls in elaborate ringlets over a neck and shoulders of exquisite mould; her head is adorned only with a boquet of roses, a moss rose in full bloom and an opening bud of the same; her right hand is raised to the cheek and her fingers clasp a most delicate fuchia: the left hand rests across the waist—and such hands and arms, perfect in their symmetry and beauty, only Raphael himself could hope to equal—the whole form is robed in a figured lace which falls in graceful folds to the feet, and the elaborate tracery of the design is most wonderful. As you look upon this figure it seems to be the work of years and of a most finished artist; and yet this picture was made in a few days by a journeyman cabinetmaker, Anderson of New York—a man totally ignorant of drawing or portrait painting. And this talent, or inspiration, or whatever else you may call it, came upon him uncalled for and unsought, without masters and without teaching. And those who are fortunate enough to have visited this well can see the same thing illustrated in the pictures exhibited here.

The medium through whom the revelation of the existence of this water came, Mr. Abraham James, was born in Pennsylvania, is of Quaker origin, was unfortunate enough in early life to be deprived even of the rudiments of a common school education. As he himself expresses it—"his father, instead of sending him to school in the winter kept him laying stone walls." Later in life he has been employed by different Railway companies in the West, sometimes as conductor, at other times as a pilot, earning only ordinary wages. It is known to me to be a fact that he is entirely ignorant of any language except the English; does not know the meaning of a single French, German, Italian, or

Spanish word. He is a simple-minded man, in the sense that he knows nothing of frauds, trickery, or imposture—perfectly truthful and upright in his character, unostentatious, and seeking no publicity or notoriety—he pursues his own way in the world, a natural, honest man. His mind is as free from a knowledge of the sciences as that of a child of five years. He has had no instruction in drawing, and, in his normal state, has no knowledge of the art of any kind or description. There are hundreds and thousands of people here among us who know him well, and who can testify to these facts. Now, with a full knowledge of this man—his antecedents, education, and history—I know it to be a perfect impossibility for him, in his natural state, or unaided by the higher powers, to do what he has done and what he is doing every day of his life.

Here on this ground, and in the rooms of this building, can be seen, by all persons who choose to visit the spot, some of the most elaborate and beautiful pencil drawings in the world. A series of geological pictures, illustrating the formation and stratification of the earth's crust—some showing the simple strata of the formation in this vicinity, which were drawn before the drill was even started, and which were demonstrated to be accurate and truthful by the descent of the drill for over seven hundred feet—other pictures show great caves and caverns in the rock, created either by vast upheavals, or by erosion—the action of water upon soluble rocks. The floors of some of these caverns are composed of great masses of the most beautiful fossil shells, which, in their shadings and perfection, are evidently the work of a master hand. The elaborate character of this shell-work, which runs through all these geological pictures—the millions of accurate pencil strokes necessary to complete them, and the very short time in which they were executed—are matters of great wonder and astonishment to all who have seen them. Many of

these drawings are on full-sized sheets of paper, 26x40 inches, and cover the entire surface; they were completed in from three to nine hours each—the latter being the longest time given to any one picture. Mr. James has also made many smaller sketches illustrating the same subject, viz: the fossils of Earth. These latter are perfect gems of beauty, and all of his work seems to be geologically correct, and is so pronounced by those who understand these matters. By reference to standard works on geology, I find their accuracy proved to a demonstration. A greater work than all is now on exhibition here. It is a diagram of this stream of water, fifteen feet in length and twenty-six inches in width. It is understood as a clairvoyant view of the stream from its source in the Rocky Mountains to its outlet on this ground. It may be called a "bird's eye" view. It exhibits on a general scale the principles of artesian wells, and demonstrates the manner in which water finds its way through the rocks and sands of earth, and finally raises to the level of its fountain head. This picture is composed of six sheets of drawing paper, each one of which was finished separately, and without any apparent reference to the others, by the medium, and were joined together afterwards, when they were all found to match exactly and make one complete work. This was the labor of only sixty hours. Persons familiar with the subject say that no ordinary artist can do the same amount of work in many months.

There has been recently added to this collection a full length portrait of the martyred President, Abraham Lincoln; this also is a work done through the same medium. The sheet of paper on which this likeness is drawn is seven and a half feet long by four and a half in width; it exhibits the President, life-size, as standing upon a rock, the broken chain of African slavery beneath his feet, and in his left hand the scroll of American liberty. This picture was put upon paper in about twenty hours,

and is in itself a most remarkable production, even of the power through which it is claimed to be received.

It is a matter of great difficulty, by any mere description in print, to convey even a tolerable idea of the nature of these works; they should be seen and carefully examined by all who are curious in the mysteries of nature.

A not less wonderful part of the matter is the manner in which the work is done. The medium labors in an unconscious state, with from two to six pencils, and with one or both hands, the pencils are placed between the fingers, and the hand moves with a rapidity which troubles the eye to follow, each pencil doing a separate part of the work at the same time, and it makes no difference whether in the dark or light; indeed his best pictures are made in a dark room. I have frequently bandaged his eyes, and held a paper between his face and his picture, and it made no difference; the pencils did their work equally as well as when his eyes were free and there were no obstructions.

There is another fact illustrated in these works, *i. e.* the medium draws a square or a circle to accurate measurement, without other implements than the mere pencil, and this with the right hand or the left.

Mr. James has gone further than these physical manifestations of the spirit power. In common with hundreds of others who can verify the facts here stated, I have for the past two years heard through him a series of discourses on all conceivable subjects, political, scientific, and philosophical, which would not disgrace the greatest intellects that ever lived. With equal freedom and facility he discusses questions of political economy and political science, geology, chemistry, medicine, astronomy, the philosophy of life, the structure of the earth, and all of the physical and natural sciences.

A distinguished professor of the science and a State Geologist,

after listening to a discourse from Mr. James on the subject, remarked, that "I have met a man who knows more about geology than I do."

I have also heard him speak fluently, and with an evident knowledge of the whole, in French, Italian, Spanish, German, and an Indian tongue, and I am confident of the fact that he is, in his natural state, wholly ignorant of any other than the English language. There is neither deception nor fraud about this man. He is beyond all question above suspicion. He makes no exhibition for money, gets no money out of it, lives a retired and secluded life. Now what is it? Upon what hypothesis can this seeming mystery be solved? These things are facts—hard, stubborn, unyielding facts. Let those who do not believe as I do in the intelligence which operating through this instrument, performs all of these wonders, solve the mystery, it is not for me.

It was through this medium that the fact of the existence of water and oil underneath this ground was revealed; this was as early as the autumn of 1863. And from that time until the water was reached, the fact was more than one hundred times re-stated and repeated, in the presence of the writer and numerous other persons, who can verify and prove this statement.

The land was selected, and the point for boring marked out by the medium in a trance state, the drill started, and the well bored at this point, with the result which is now visible to all—(a synopsis of the objects and purposes of this revelation is given in a previous page.) They will be carried out by the parties in whose hands the matter rests. Chicago is now on her grand march to her position as the second city on the continent, and there are those now living who will see her reach it. And such will also see on this ground, and from this simple commencement, a structure reared which will be, not only an ornament to the great Northwest, but a shrine of religious liberty and truth, around which shall gather pilgrims from all the wide world.

In the fullest confidence that the Supreme Ruler and Creator of the Universe has done all things well, "that everything that is, is right," that eternal progress is the law of nature and nature's God, that no man should call God his Father who does not also call man his brother, we launch our little barque, freighted only perhaps with the germ of a truth, out upon the great waters. She will return before many days, laden with the fruits of her mission.

CHICAGO, JUNE, 1865.

ARTESIAN WELLS.

The following are among the principal wells of the world:

The Grenelle well, at Paris, depth 1,806 feet, flows 500,000 gallons of water in twenty-four hours—temperature of the water 82° F., and salt—used only for heating the hospitals.

The well of Passy, in the same basin, and about the same depth, is the largest well in the world—two feet in diameter and discharges 5,660,000 gallons of water per day.

The Belcher well, at St. Louis, is 2,199 feet deep, and discharges 75 gallons per minute. Water 73° F., highly impregnated with mineral substances, and has a strong odor—useless for any except medicinal purposes.

The Kissingen well, in Bavaria, is 1,878½ feet in depth and four inches in diameter. Temperature 66° F.—discharges 750 gallons per minute.

The well of Munden, in Hanover, is nearly 2,000 feet in depth; other particulars not known.

Two wells at Charleston, S. C., are 1,250 feet in depth, each discharge about 1,200 gallons per hour; water salt, and temperature 87° F.

The well at Jackson, Mich., is over 2,000 feet deep—no water, and is now abandoned.

There is also a deep well at Columbus, Ohio, and another at Louisville, Kentucky; and hundreds of others scattered over the United States, which have no special public significance.

OF THE ORIGIN OF PETROLEUM.

ITS USES AND APPLICATIONS.

THE present state of geological knowledge is not such as to warrant the assertion by any of its professors, that oil will or will not be found in particular localities—among particular rocks, or under certain peculiar conditions, and none other. The subject is too new, of too recent an origin to come as yet fully within the scope and understanding of this, the youngest sister of the sciences.

She can only determine that this article has been found and brought to the surface in certain specified districts of country, and then the facts, which have been demonstrated and gathered in the experience of mining for oil, may be collected by geology and brought to bear on the subject with all the force of which they are susceptible, but she cannot go further and lay down arbitrary rules as to the origin of this article and the laws of its existence and production. This is beyond the present range of knowledge. Nor can geology determine and decide, that oil will or will not be found beneath the ground from mere surface signs or indications. It may know what these indications are in districts where oil is found, but it cannot be said that the absence of such signs in another district proves also the absence of oil, for the indications, when there are any, vary, in different localities, and oil may exist, in places where no indications of any kind can be discovered.

Time and experience will, in all probability, develop a state of facts which will enable us to determine with some degree of accuracy, the primary laws relative to this wonderful product of our Mother Earth, and in the meantime we can only speculate and reason upon probabilities: that is the extent and the purpose of this paper, to examine and to reason. If I succeed in throwing any light upon the subject, it will be well; if not, no harm will ensue. A great variety of theories as to the existence and origin of petroleum have from time to time, found place in the current literature of the day. Some of these are reasonable and plausible; others are ridiculous and absurd; men of solid, scientific acquirements; those who have familiarized themselves with, and possess a substantial knowledge of the history of the earth's crust, are slow to propound any solution of the subject, and only state such results as the known facts of the case seem to warrant, while the rise and rapid progress of this article, its great commercial value, and the wild, speculative fever engendered thereby, have brought forth a swarm of empirics, men ignorant of the first principles of natural science, and bent wholly upon the mere matter of money which could be obtained by presuming "to know all about it," have vented a thousand wild theories and vagaries, which have no other foundation than their own visionary imaginations.

One of the earliest suppositions, and which obtained a degree of credit, by certain superficial reasons urged in its favor, was, that oil was in some manner in the great laboratory of nature, distilled from the coal beds. It was stated in support of this position, that the same article was obtained by the distillation of coal in a retort; and hence, that the article found in the earth, and which came rushing to the surface in great volumes, must have been made in the same way, but the supporters of this theory overlooked the one important fact, that when coal is

artificially decomposed and separated into fluids and gases in a retort, there is a residuum left which is called coke, and that if nature had so distilled the coal, she had forgotten to leave the product, as there are no great beds of coke found anywhere upon the earth's surface. When this objection was first urged, it was after some time replied, that the anthracite coal, of the Alleghanies, was the product or residuum of Nature's still; but as man cannot distill coal and make the anthracite in the process, that supposition, was soon abandoned; and there was another fatal objection to this theory, and that was this: that no bituminous coal from which it was supposed nature had distilled the oil, has or could be found anywhere in the region of the largest oil deposits, and the anthracite was still farther removed.

Another great fact which operated against the truth of this hypothesis, was proved by the borings into the earth and the discovery of oil, hundreds of feet *below* the coal measures. This oil, as shown in the flowing wells, having a powerful tendency towards the surface, and not downwards—the question naturally arose, how did the oil ever get so far down into the rock, when according to its natural law it should come to the surface? And for these reasons, among others, the coal theory was disposed of—and it now seems more probable, and stronger reasons can be urged in support of the proposition, that coal was formed from oil, rather than that oil was formed from coal; and the day may not be distant when this position will be demonstrated by incontrovertible facts.

There was another theory once started by a professor of Geology in a college in Ohio—"That oil was projected to the surface by the direct pressure of a stream of water whose head was higher than the issue." This professor did not, I believe, attempt to account for the origin of the oil, but simply to explain the manner in which he thought it came to the surface. It is

sufficient to refute this absurd position by simply saying, that, if it were true, that the water forced the oil, (being an impediment in its way,) to the surface, then when the oil ceased flowing, it would be followed by the water, which, as a matter of fact, never occurs, though hundreds of wells of oil have ceased to flow; yet, not one has ever became a flowing well of water. While in the earlier days of the history of petroleum, and when it had as it were, thrust itself with a presuming air upon the notice of men, numberless crude and uncertain speculations concerning its origin and existence, were put afloat; yet, within the past year or two, much genuine scientific knowledge has been brought to bear upon the subject, and a light thrown about it, which will in all probability eventually elucidate the whole matter. More attention has, however, been paid to that branch of the subject which pertains to the refining of petroleum, and its applications and uses than to mere speculations as to its origin, and the laws which govern its existence in its native beds among the rocks of the earth. Dr. Thomas Antisell, Abraham Gessner, and Dr. Theodore Opplerr have published treatises pertaining to this branch which are highly valuable and useful. While Professor Henri Erni, of Washington, has recently published by far the most valuable work on the origin of oil, which has yet appeared anywhere.

Professor Erni is of the opinion that "Petroleum is a product of chemical decomposition, derived from organic remains, plants and animals, whole generations of which perished and accumulated during many destructive revolutions at the various ages or epochs of our planet."

But as to the manner in which these oily hydrocarbons were originally produced, he says that scientific men are still divided in opinion. I have italicised a portion of the last sentence for the reason that, as I believe, an elucidation of the doubt therein

expressed, contains the key of the whole subject of the origin of oil. Deferring for the moment what is to be said in this respect, let us see Professor Erni's further opinions on the subject :

"That petroleum is of vegetable or rather of organic origin, is too manifest from its composition to require argument."

There are but two opinions, he says, in regard to the manner of its production which require notice. "The one is that oil was derived during the first bituminization or conversion of woody fibre into coal. The other maintains that coal beds or bituminous rocks, such as schists and shales have by a process of distillation yielded up their oily matter which they derived from plants and animals."

The arguments in favor of and against these opinions are stated fully and at length, the professor finally inclining to sustain the first hypothesis.

But it is manifest that whichever of these opinions be true, they both fail to account for the primary origin of the oil. The first, stating "that oil was derived during the first bituminization or conversion of woody fiber into coal," fails to account for the manner in which the primary elements of the oil found its way into the woody fiber, in order to be extracted by this process of conversion into coal, whence they came, and what these elements are or were, the opinion does not explain.

The second also fails, to the same extent, in not accounting for the manner in which, or the source from which, the rocks and schists and schales derived the bituminous matter which it claims was yielded up in the process of distillation. Hence, while either of these positions may be true as far as they go, they do not reach the root of the matter, nor decide the question as to the primary origin of oil.

The expression "primary origin" may be open to criticism, for, the reason that if we once determine the origin of a substance

there can be nothing more primary than that; but I use it understandingly, and for the purpose of showing that I intend to go beyond the point where oil is commonly supposed to originate.

There may now be no reasonable doubt of the fact that this substance has been traced back to a place where it has some connection with the article coal and its relatives; and if it be true that "petroleum is a product of chemical decomposition derived from organic remains, plants and animals," whence came the substance contained in these organic remains from which it was derived? An answer to this question will carry us far back in the darkness of Time, to a period in the Earth's history which may be styled the beginning of all created things.

The great mass of solid and liquid matter—the earth, the rocks, the water, and the fire which now constitute our planet, were once but a shapeless mass of nebulous matter, imponderable and without form. This matter was gaseous in its nature, and contained within itself the primitive elements of all things which have subsequently and do now appear on the face of or beneath the surface of the Earth. By the fiat of the Supreme Ruler of the Universe, this matter was given motion and sent on its mission among the celestial spheres. Gradually, by its revolutionary motion condensing its materials about the center, and assuming a spheroidal form, the surface became more condensed and a crust began to appear, and here beneath this crust, and mingled in seeming confusion, were contained all the elements, all the primitive principles of everything we see, and know, and feel—the ground that we stand upon—the rocks and stones beneath our feet—the gold, the silver, the copper, tin, lead, and all mineral substances—the waters of the ocean and of the land, of all plants and vegetable matter—and of the whole animal kingdom, from the lowest in the order up to the great pinnacle, the microcosm man.

These primary elements were, and are yet—for creation has not ceased—in commotion; boiling, surging and upheaving; particular principles seeking and finding chemical affinities, and rushing from the center to the circumference, slowly, but gradually and surely, compounding themselves into the material things which we now see around us. Low down in the Earth's crust, as far as man's knowledge has enabled him to penetrate, we find the primitive or crystallized rock, such as the granite and the gneiss, wholly devoid of all appearances of vegetable or animal matter; then the Silurian, or the age of mollusks, the lowest order of animal life; the Devonian, or the age of fishes, the first vertebrates; and then the Carboniferous, or the age of coal, in which the flora of Earth probably reached its rankest and most luxuriant growth. And thus upward did creation go, until the soil was prepared for man's occupation, and the surface of the Earth became lovely and beautiful to behold.

All of this occupied countless millions of ages, so long that numbers fail to express any meaning, and the mind of man cannot comprehend the numberless centuries which have elapsed since the "earth was without form and void." All of this is clearly demonstrated by what little we yet know of the science of geology, though it may contravene some of the established opinions on the subject, and it is now considered a well-settled fact among the scientific men of the world, that the story of the creation in six days occurring a few thousand years ago, is a mere fable related at a time when the human intellect was incapable of comprehending any more elaborate theory, and it does not require any given amount of mere book learning to understand this great truth. But take your stand for once on the banks of that great chasm at Niagara, and cast your eye down the river toward Lewiston—behold this mighty rush and whirl of the terrible river, learn what you can of the wear of the water on

the rocks at the brink, and then ask yourself the question whether this great gulf was cut in six thousand, or six hundred thousand years.

But as this is rather a diversion, let us return to the main question, the origin of petroleum.

We believe that this article is one of the primates of earth—one of the primitive elementary principles—originating in the earth's centre and finding its way to the surface just as all other things do, combining here with one substance, and then with another; that certain original gases combining to form bituminous matter, and the hydrocarbons of commerce, struggle through the rocks of the earth, find their way into the caverns and seams made by erosion or upheavals, and these sublime or condense into the substance we find and call Petroleum or Rock oil. This may be a mere opinion, founded upon no substantial facts; but are there not reasons strong in its favor? Whence come the gold and silver, the precious stones and gems of earth? whence the rocks, and stones, and soil? how were they formed if not by a chemical combination of primitive gases and elements—and why not oil?

And we further believe that all of the oils and oily matter found everywhere in nature, has a common origin, and that origin the same as petroleum. The chemical combinations are different, and so is the result, and thus one oil differs from another in particulars, but all have a common parentage.

There is no substance, no one principle more common in nature than this. It is found in various minerals, in the rocks and stones of earth, and it pervades the entire vegetable and animal kingdoms. It can be extracted by distillation or chemical operation from anything that grows or lives, the common oil of turpentine; of the castor bean, and the fusel oil of grain, are familiar examples. And even the simple grasses which grow

on our broad prairies, contain the same principle; else where do the cattle which live almost solely upon grasses and grain, obtain that oily or fatty matter which alone renders them fit food for man? whence comes it, if not from the very heart of Mother Earth herself?

There is no animal that lives, not excepting man himself, that does not from the very necessities of its existence, extract greater or less quantities of this element from the food upon which it thrives. And hence, the inference is plain and simple, that this common, necessary, and all-pervading element, and without which there would be no life, is one of the primary elements of earth—one of the first principles of nature. In the article petroleum, it is true that it assumes a shape different from those with which we have heretofore been familiar, but this fact does not invalidate the truth of this position; on the contrary, it rather tends to strengthen it, for it exhibits the principal substance in a state or condition more primitive and fresher from its fountain head. We find it deep down among the rocks and stones long before it reaches the surface, or is called upon to enter into or take its part in the vegetation which grows upon the soil.

From these facts, we reason that this oily substance is one of the primates of earth—one of the first elements. We infer this from its universality; it is everywhere present—it is all-essential—it is necessary to the growth of all vegetable matter, and the animal kingdom cannot exist without it. It is in the blade of grass, the grain of corn, and in the bodies of men and of beasts; it is one of the very elements of life itself, and yet this statement is subject to a qualification; while we say "one of the first elements of earth" it is, well also to say that the strictly simple elements are few in number. Chemistry has as yet found only about fifty-five of these, and nearly or quite all of the various forms of matter are compounds of some two or more of these

simple elements; and to this rule petroleum is not an exception, for it is a compound of a number of gases and substances. We call it a primate in a general sense, and not under the rules of a chemical analysis, addressing rather the common understanding of men, than the critical examination of some particular science; and as it has been a common supposition that this article had its origin in the coal measures, which we believe to be erroneous, this theory is intended more to correct this impression and to elucidate the truth, than to lay down any arbitrary rule on the subject. We have urged the primitive nature of this article as much from the fact that it is a substance primitive to the senses of man, as for any other reason. As we find it away down in the rocks, among the first of the solids and fluids, it is sensible to the touch, to the sight, to the smell; in this shape or form this is the first we know of it, and in that sense it is primary to us; and so the very rocks themselves—though readily resolved by the chemist into their component gases—are called primary; they are the first which we know of that form of matter which is termed rock, and hence are primary to the senses.

In the beautiful Laboratory of Nature the creative process is in continual operation—it goes on forever and forever; the simple elementary principles are ever forming new combinations, new substances, and new forms of matter. The chemist who resolves and re-resolves some particular substance into its original elements, is simply unfolding or disclosing the process by which his great Teacher had before resorted to, to compound that specific article, and while nature continues at her work the man of science will ever find new fields for the exercise of his special talents.

As the necessities of man require it, or as the progress of the race in civilization requires it, nature brings forth from her great store house, beneath the soil and the rocks, such articles and

substances as the time and the occasion demand. And she is no niggard with her wealth, but deals it out in profusion and with a bounteous hand. Nor does she recognize an elected few upon whom alone her favors are bestowed, but she gives alike to the whole brotherhood of man. She is ever forming new combinations, evolving new substances and creating such new materials as are required by the progressive development of mind; and in this material which we call petroleum, she has produced an article, of which as yet we have but a limited knowledge, but which when we come fully to understand, will no doubt prove in its results and its uses one of the most beneficial ever bestowed upon mankind.

The article petroleum or rock oil has been known and used for hundreds of years in the East, but the quantity was limited and its uses circumscribed. It was left to the energetic, intelligent men of the present day to develop it in vast quantities—to discover its virtues and its uses, and to apply it to the benefit and comfort of the race. It would seem that in the wisdom of the Creator, this now invaluable product had been, as it were, concealed in the depths of earth, until civilization and education had brought the human race up to that position, at which it could be most beneficially applied, and its many virtues be most fully developed.

Rapidly has it grown into favor, and many are the uses and applications of this article. But there are other purposes for which it will in time be used which will far surpass any now known. It will no doubt eventually be produced in such quantities as to render it economical as a fuel for ocean navigation—for why carry or load down a vessel with hundreds of tons of cumbersome coal, when one-third the weight in petroleum would answer the same purpose; the fires can be regulated and the fuel fed with less than one-quarter the labor it now takes to fire with coal, and the room which the latter now occupies would be free for

other and more useful purposes. The great steam frigate Dunderberg cannot now carry coal enough to take her across the Atlantic. With petroleum she could cross three times with the one supply. In short, there is no possible argument against the use for this purpose, except the present cost; but the time will eventually come when this objection will be obviated by the enormous product of the country. Another article of great domestic consumption will some day be manufactured from petroleum, and that is the gas of cities—this gas now made from coal, costs from two dollars and a half to four dollars per thousand cubic feet. It can be made from Benzine—a product retained in the refining of petroleum, for less than one-quarter the price of ordinary coal gas—and it will yet be done. This question has been already opened, and a number of machines have been constructed to convert atmospheric air into illuminating gas, by simply passing it through or over the surface of Benzine, and these machines work successfully. One city, La Crosse, in Wisconsin, is now lighted in this manner, and several large factories in the East are lighted in the same way. Among many others, a part of the United States Armory at Springfield, Massachusetts; and Parker, Snow & Co.'s factory at West Meriden, Connecticut. Other cities, towns, and villages, will follow the example, and soon the cheapness and utility of this method will supersede the old one, and coal gas will pass out of existence. A new machine has been recently introduced in the West, which for simplicity of construction and practicability appears to be unequaled. It consists simply of a series of shallow pans, placed one above another. These pans are partially filled with Benzine; the pans are connected, and from the lower one the main gas-pipe issues. Here the inventor avails himself of a well-known law in Natural Philosophy—the expansive nature of gas—calls it to his aid and makes it do his work. This is all the

machinery there is; the burner is opened, the current of air commences, passing downward and over the fluid, and by the time it enters the pipe, is sufficiently charged. This operation continues until the Benzine is consumed, when the pans are again filled. This machine can be placed anywhere in a dwelling house, and makes gas for less than fifty cents per thousand feet.

Petroleum is also fast growing into favor as a fuel, for domestic uses. We already have numerous cooking stoves, designed for and successfully using this substance. It is said even at the present prices, to be quite as economical for summer stoves, as either wood or coal.

A learned and careful authority says:

"As a fuel, petroleum enters into numerous French patents. The people of the Caspian Sea mix it with clay; the Norwegians with sawdust and clay. The refuse charcoal of the French furnaces is mixed with charred peat or spent tar, and tar or pitch is added, and the whole ground or coked. As an illuminating agent, coal oil is fast supplanting the animal and vegetable oils. It has always been a lamp oil of India. It lights the streets of Genoa; but its natural odor is so disgusting that its use in Europe was, for a long while after its discovery in Lombardy, interdicted. Since the refining process was discovered, the trade has spread to every city in the Old and New World, and the annual number of patents for new forms of lamp and new kinds of candle shows how completely the kerosenes and parafines are banishing the whale oils and tallows from the market."

And we are informed that—

"The experiment is being practically tested at the Downer Refinery, in Corry, Pennsylvania; where it was giving much satisfaction, producing a heat as powerful and regular as any ever produced from either bituminous or anthracite coal. It

must be remembered that this article is produced from what was at first rejected as the debris or useless residuum of petroleum, but it is now coming into market as one of the most valuable products."

Petroleum has produced new colors. Says a scientific traveler:

"Among the most favorite colors for silk goods, ribbons, etc., in the market, is a color produced from the residuum of the petroleum, and manufactured at the Humboldt refinery, near Plummer, in the Oil Creek region. It is a bright and fixed cerulean blue, or perhaps a shade darker, but still as brilliant, and is called the Humboldt color. The process of manufacturing is kept a profound secret by the discoverers, who are German chemists, and do not speak, if they understand, English. No stranger is allowed to enter their works except by special permission."

I do not understand that as yet the beautiful aniline colors, manufactured from coal tar have been found to exist in petroleum, but new developments may be expected in this direction, and the chemists may yet startle the world with the intelligence of some new and wonderful substance discovered in Petroleum.

"Greek fire" is a compound of petroleum. One author on the subject says:

"The 'Greek fire' of more modern times was probably compounded of petroleum from the Zantean springs. From the time of Zoroaster the Naphtha of Baku has been sent all over Asia for the service of the sacred fire of the Parsees. The liquid streams spontaneously through the surface, and rises wherever a hole is bored. But especially at Belegan, six miles from the capital village, the sides of the mountain stream with black oils, which collect in reservoirs constructed in an unknown ancient time, while not far off a spring of white oil gushes from the foot."

As an illuminating oil, petroleum is too well known to need any description; for a rapidly acquired and deserved popularity it has never had an equal.

Just as the sea had about given up its last monster to furnish light for man, the creator placed the knowledge of the existence of this oil before the human mind; man was prepared to receive it, and it came, and although it has been known for centuries in the older countries—yet it seems that until the present day, it was not needed—and hence attracted but comparatively little attention.

I have thus attempted a theory on the origin of this article, and have enumerated a few of its uses. If the first does not commend itself to the judgment and reason, let the fact that all matters pertaining to this most wonderful substance, possess at the present time an unusual interest, be my apology.

The following paragraph from a writer on petroleum, will take us back to the spirit of the work in which we are engaged on this ground:

"Many years ago, as the Seneca Indians have the tradition, the Great Spirit appeared to one of their chiefs in a dream, and told him that if he would proceed to a certain part of the country he would find, oozing up from the earth, a liquid which would prove a balm for the cure of many ailments to which red men as well as white men were heirs to. The chief proceeded to the spot, and there found the balm flowing copiously from the bosom of the earth. The instructions of the vision were complied with, and sure enough the liquid proved a healing ointment to the tribes of the Senecas. There are white people now living who were treated medicinally by these Indians with this ointment, and we believe there is still an article known and sold in the drug stores as 'Seneca oil.'"

BORING THE SECOND WELL.

In May last, a twenty foot overshot wheel and the necessary machinery for boring, with the water power, having been constructed, the work on this well was commenced, the power being furnished by the water from the first well, which is carried up twenty-five feet above the surface in a three and a half inch tube to the flume, which discharges it over the wheel. Although the volume of water is comparatively small through an orifice of this size, yet the great diameter of the wheel is an ample compensation in this respect, and furnishes sufficient power for the purpose. For the construction of the machinery, and the successful intelligent application of scientific and mechanical knowledge in boring this well from the surface to the water, we are indebted to our friend, the general superintendent of this work, Mr. W. T. B. Read. As he has ever manifested an interest in the work, equaled only by the energy and skill with which he personally directed its execution, it is but just that we pay him this tribute, by connecting his name with its history.

This well, like its predecessor, was located through the clairvoyant powers of Mr. James. In a state of unconscious trance, the spiritual intelligences through him selected the precise spot,

on the surface beneath which the water would be again found; and here the drill went down, and here the water was found.

This fountain lies deep down in the bowels of the earth, concealed from the natural sight. The physical senses cannot perceive it, and man cannot find it, but the intelligence which made this revelation, with powers of vision which pertain only to the Immortal, said to us, "Come, and we will show you the exact location of this water, and we will demonstrate at once the truth of clairvoyance, and the fact of the spiritual communion."

While we frankly admit the existence of a bare possibility of coming upon the first well of water by chance accident or guess work, yet the discovery of the second well by the same means, and through the same source as that which indicated the first, reduces this possibility to a very slight thread; in fact turns the scale the other way, and as a mere matter of evidence the predicted result twice recurring, seems conclusively to demonstrate the fact that these things are what they claim to be, and not chance accident or guess work.

The second well is located about nine feet distance from the first; is 694 feet 4 inches in depth, to the surface of the water; was commenced on the 8th of May, and reached the water on the 1st day of November following. There are no striking geological differences in the two wells, the rock penetrated being almost the same in character, and exhibiting the same signs of oil. The water in the new well is entirely free from the odor of sulphur perceptible in the first well; this is owing to the fact that the vein of sulphuretted hydrogen gas which enters the well before it reaches the fountain, was not touched in boring the second well.

This water may now be considered as the clearest, purest and

best in the world. On the surface of the ground there is none like it, and no other Artesian well approaches it in purity or temperature.

In the absence of any accurate measurement, we conjecture that the two wells are now flowing about twelve hundred thousand gallons per day.

The subjoined diary of the practical part of the boring of this well, with some remarks on the subject generally, may be of public interest, and are given accordingly:

May 8, 1865. Commenced drilling with rods, in the solid rock, at the surface, having first blasted and removed the loose rock, to the depth of five feet. Drilled eleven feet this day, in the dark, porous limestone, sixteen feet from the floor of the derrick.

May 9. Eight feet. Gray limestone. Total, twenty-four feet.

May 10. Drill fast in the Well, at twenty-six feet. Jarring all day and all night. Suppose that a loose stone fell on the top of the tools.

May 11. Still jarring. The tool was a single-faced, five inch chisel drill. Stone probably caught on the shoulder of the drill.

May 12. The continual use of the jar loosened the drill to-day, and it was recovered.

May 13. Drilled six feet, to-day—total, thirty-two feet. At thirty feet, penetrated the buff limestone called here the Athens or Joliet Marble.

May 15. Drilled five feet. Depth thirty-seven feet. Marble.

May 16. To-day, eight feet—same as above.

May 17. To-day, six feet—same as above.

May 18. To-day, two feet—same as above.

May 19. To-day, four feet—same as above.

May 20. To-day, four feet—same as above—total sixty-one.

May 22. Drill got fast. Probably falling stones. Recovered same day by use of jars.

May 23. To-day, six feet. Marble. Total sixty-seven feet.

May 24. Today, eight feet. Marble. Total seventy-five feet.

May 25. To-day, ten feet. Marble. Total eighty-five feet.

May 26. To-day, nine feet. Marble. Total ninety-four feet.

At this point, we introduced a new reamer, for the purpose of trueing up the Well, and spent five days in reaming that which had been already drilled. And now, instead of using the single five inch drill, a new drill, 3¾ inches in diameter, was inserted, and followed by a five inch reamer, and this manner of drilling was retained to the end.

June 2. To-day, nine feet. Marble. Total, one hundred and three feet.

June 3. To-day, twelve feet. Marble. Total, one hundred and fifteen feet.

June 5. To-day, six feet. Gray stone, six feet thick.

June 6. To-day, twelve feet. Marble. Total, one hundred and thirty-three feet.

June 7. To-day, nine feet. Marble. Total, one hundred and forty-two feet.
June 8. To-day, nine feet. Marble. Total, one hundred and fifty-one feet.
June 9. To-day, six feet. Marble. Total, one hundred and fifty-seven feet.
June 10. To-day, three feet. Marble. Total, one hundred and sixty feet.
June 12. To-day, six feet. Marble. Total, one hundred and sixty-six feet.
June 13. To-day, seven feet. Marble. Total, one hundred and seventy-three feet.
June 14. To-day, three feet. Marble. Total, one hundred and seventy-six feet.
Straps pulled off the poles and the tools left in the well.
June 15. Working for the tools in the Well.
June 16. Tools recovered.
June 17. To-day, six feet. Marble. Total, one hundred and eighty-two feet.
June 19. To-day, nine feet. Gray limestone, twelve feet thick.
June 20. To-day, six feet. Marble, again. Total, one hundred and ninety-seven feet.
June 21. To-day, six feet. Marble. Total, two hundred and three feet.
June 22. Repairing.
June 23. To-day, three feet. Marble. Total, two hundred and six feet.
June 24. To-day, nine feet. Marble, perfectly white, and very fine grained.
From *June* 26 to *July* 10, we were engaged in changing the machinery, from the pole drilling to that of a rope, and from this date the rope was alone used—having abandoned the poles, as an old and hazardous method, and adopted, in their stead, the more modern, and safer and more expeditious method of the rope. We use a four and one-half inch three-ply cable laid hawser.
July 10. To-day, four feet. Marble. Total, two hundred and nineteen feet.
July 11. To-day, six feet. Marble. Total, two hundred and twenty-four feet.
July 12. To-day, three feet. Marble. Total, two hundred and twenty-seven feet.
July 13. To-day, three feet. Marble. Total, two hundred and thirty feet.
July 14. To-day, six feet. Gray limestone. Total, two hundred and thirty-six feet.
July 15. To-day, six feet. Gray limestone. Total, two hundred and forty-two feet.
July 17. To-day, six feet. Gray limestone, dark. Total, two hundred and forty-eight feet.
July 18. To-day, twelve feet. Gray limestone, dark. Total, two hundred and sixty feet.
This gray limestone was thirty feet thick.
July 19. To-day nine feet. Marble, again, nearly white.
July 20. To-day, twelve feet. Marble. Total, two hundred and eighty-one feet.
July 21. To-day, nine feet. Marble. Total, two hundred and ninety feet.
July 22. To-day, twelve feet. Sediment, mixed gray and white, evidently running into a darker stratum.
July 24. To-day, ten feet. Dark gray stone. Total, three hundred and twelve feet.
July 25. To-day, eight feet. Gray and white mixed running out. Eighteen feet of dark gray limestone.
July 26. To-day, twelve feet. Light gray limestone. Total, three hundred and thirty-two feet.
July 27. To-day, eleven feet. Light gray limestone. Total, three hundred and forty-three feet.
July 28. To-day, ten feet. Light gray limestone. Total, three hundred and fifty-three feet.
July 29. To-day, nine feet. Light gray limestone. Total, three hundred and sixty-two feet.
July 31. To-day, eight feet. Dark stone, very hard.

August 1. To-day, five feet. Dark stone, very hard. Total, three hundred and seventy-five feet.

August 2. To-day, four feet. Hard and flinty. Total, three hundred and seventy-nine feet.

August 3. To-day, four feet. Hard and flinty. Total, three hundred and eighty-three.

August 4. To-day, two feet. Still harder. Wears out the drill in from six to twelve inches.

August 5. To-day, five feet. Very hard. Total, three hundred and ninety feet.

August 7. To-day, five feet. Gray limestone and flint. Total, three hundred and ninety-five feet.

August 8. Lost the drill to-day. The bit or drill became loosened where the auger stem joins, and washed off. The loss was not discovered for three hours, and, during the whole of that time, the entire weight of the tools, about eight hundred pounds, was falling upon the head of the bit, in the bottom of the Well. By these repeated blows, the upper end of the drill was driven one and one-quarter inches in the side of the well, under a shelf or shoulder. The Well had rather a dark look to-day.

August 15. Drill recovered, after a week's work, and recovery effected by means of a ring grab. Particulars cannot be given without drawings. Four hundred feet. Drilled five feet to-day. Stone and shale.

August 16. To-day, eight feet. Rock and shale mixed.

August 17. To-day, seven feet. Clear shale, very tough and sticky. This shale is very dark blue, is saturated with petroleum and appears like putty.

August 18. To-day, five feet. Shale. Total, four hundred and twenty-five feet.

August 19. To-day, ten feet. Shale. Total, four hundred and thirty-five feet.

August 21. To-day, nine feet. Shale. Total, four hundred and forty-four feet.

August 22. To day, eleven feet. Shale. Total, four hundred and fifty-five feet.

August 23. To-day, twelve feet. Shale. Total, four hundred and sixty-seven feet.

August 24. To-day, thirteen feet. Shale. Total, four hundred and eighty feet.

August 25. To-day, twelve feet. Shale. Total, four hundred and ninety-two feet.

August 26. To-day, eleven feet. Shale. Total, five hundred and three feet.

August 28. To-day, eight feet. Shale. Total, five hundred and eleven feet.

August 29. To-day, nine feet. Shale. Total, five hundred and twenty-five feet.

August 30. Repairing.

August 31. To-day, eight feet. Shale. Total, five hundred and thirty-three feet.

September 1. To-day, ten feet. Shale. Total, five hundred and forty-three feet.

September 2. Accident to tools. Screws broken at all the joints, but nothing in the Well. Depth, by accurate measure, five hundred and fifty-five feet, and good showing of oil. Sediment shows a coating of oil at every pumping, as it has done all through this band of shale.

September 4. To-day, three feet. Hard rock. Sandstone. The first encountered. Wears the drill very fast. This stone is reddish in color, and seems filled with oil.

September 5. To-day, six feet. Same as above. Total, five hundred and sixty-four feet. Good show of oil.

September 6. To-day, six feet. No change. Total, five hundred and seventy feet.

September 7. To-day, four feet. No change. Oil. Total, five hundred and seventy-four feet.

September 8. To-day, six feet. White flint. Iron pyrites.

September 9. To-day, five feet. Very hard. Oil at every pumping.

September 10. To-day, Sunday, measured Well, five hundred and eighty-eight feet, and shows oil.

September 11. To-day, five feet, through very hard flinty limestone. Renewed drill every twelve inches. Shows of oil. Total depth, five hundred and ninety-three feet.

September 12. The hardest rock yet met with. One drill only went two inches. The second, only three inches. Still shows oil. Drilled six feet. Total, five hundred and ninety-nine feet.

September 13. At ten, P. M., this day, the jars broke, leaving reamer three feet long, auger stem, twenty feet long, and lower part of the jar, eighteen inches long, in the bottom of the Well, six hundred and five feet.

September 14 to 20. Making a grab to recover the tools. This grab is a hollow cylinder, with a loose pawl or valve, made to go over the lost tools, and catch as it comes up. Cannot be described without a drawing.

September 22 to 24. After several attempts, and breaking and losing a number of pawls, finally got over and a firm hold of the tools, and at six, P. M., on the 24th, they were all safely brought to the surface.

September 26. Made seventeen inches, with four drills—the broken pawls and pieces of steel in the bottom of the Well retarding the progress of the drill. Six hundred and six feet, five inches.

September 27. Very hard sand and flint rock. Made two feet, in twenty-four hours. Six hundred and nine feet. Shows of oil lost.

September 28. Hard, reddish sandstone. Three feet. Total, six hundred and twelve feet.

September 29. Same stone. Three feet. Total, six hundred and fifteen feet.

September 30. Same as above. Three feet. Total six hundred and eighteen feet.

October 1. To-day, three feet. Same rock. Broke the jars last night, but the tools came out safely. Total, six hundred and twenty-one feet.

October 2. To-day, six feet. Same rock. Total, six hundred and twenty-seven feet.

October 3. To-day, three feet. Same rock. Total, six hundred and thirty feet.

October 4. To-day, six feet. Same rock. Total, six hundred and thirty-six feet.

October 5. To-day, six feet. Same rock. Total, six hundred and forty-two feet.

October 6. To-day, six feet. Same rock. Total, six hundred and forty-eight feet.

October 7. To-day, eight feet. Sandstone, but much softer. By accurate measure, to-day, six hundred and fifty-six feet and six inches.

October 8. Six hundred and sixty feet, this morning. No sediment from the sand pump. Well commenced overflowing quite freely last night, and the old Well diminished in its overflow three-fourths of an inch—showing that a crevice or seam, leading from the old well, had been tapped by the new one.

October 9. Drilled three feet. No change. Total, six hundred and sixty-three feet.

October 10. Drilled six feet. No sediment. Water washes it all up. Total, six hundred and sixty nine feet.

October 11. Drilled, to-day, six feet. Total, six hundred and seventy-five feet.

October 12. Drilled, last night, three feet. At nine o'clock, to-day, the jars broke off, leaving drill, auger stem and broken jar in the bottom of the Well.

October 13, 14 and 15. After several attempts with the hollow grab, finally got hold of the tools, on the 15th, and recovered them.

October 16. Drilled all day, but made no progress. Some iron cuttings on the drill. Water flowing very freely.

October 17. Drilled all night. Made three feet. Depth, six hundred and seventy-eight feet.

October 18. Drilled three feet. Total, six hundred and eighty-one feet. No special change.

October 19. Drilled four feet. Total, six-hundred and eighty-five feet.

October 20. At nine o'clock this evening, jars broke, split open, left the lower part of the jar, auger, stem and reamer in the Well, at 686 feet.

October 21, 22, 23 and 24. Made several attempts with the hollow grab to get hold of the tools, but were unsuccessful.

October 25. Cut off and pointed the broken part of the jar, and inserted in the side a steel drop key, with a slot cut in the opposite side of the jar; lowered this in the Well with a sinker bar and another pair of jars attached. The broken jar thus arranged, slipped at once over its counter part in the Well, the key dropped to its place, and the tools were caught. They came to the surface in less than thirty minutes.

October 27. Drilled three feet last night. Depth of Well this morning, six hundred and eighty-eight feet, ten inches.

October 28 and 29. Drilled forty-eight hours and made no progress—drills not worn or defaced—come up as sharp as they go down, but the bevel sides of the drills are highly polished, and magnetized steel filings adhere to the sides of the drill, which assume the appearance of having been covered with quicksilver, like the back of a mirror. Face of the drills perfect, but much worn at the sides—finally conclude that we are drilling in a crevice, the sides of which are composed of iron pyrites, the drill never striking on its face.

October 30. Appearance of working through—made some better progress—some sediment showing in the water, and finally made three feet.

October 31. At three o'clock this morning the screw on the auger stem broke, and left it and the reamer in the bottom of the well. Depth six hundred and ninety-one feet and ten inches. This is the fourth time the tools have been lost since the Well was down 600 feet. At twelve o'clock the "ring grab" was lowered and made fast, and the tools came out at once—at work drilling again at one o'clock.

November 1. Wednesday. At a quarter before one A. M., this morning, the drill penetrated the arch of the rock in the cavity before referred to, and the water came to the surface in great volumes. Depth of the Well to the top of the cavity, six hundred and ninety-four feet and four inches.

November 2. Reamed out the last three feet, to the water, making the Well full size of five inches all the way down—the volume of water much increased by the reaming, and the overflow in the old Well much diminished, having fallen to about four inches. This diminution is caused by the elevation of the water in the former Well to a height of twenty-five feet above the surface, while the new Well is discharging *upon* the surface. If both Wells were discharging at the same level, the overflow would of course be the same, and each well would discharge relatively a quantity of water in proportion to its size.

A FEW REMARKS ON THE PRACTICAL PART OF WELL BORING.

Formerly the boring of an Artesian well was regarded as an extremely difficult and hazardous undertaking, and even now with all of the experience furnished by the Pennsylvania oil wells, there are frequently great troubles encountered, and many wells are lost by accidents to the tools, &c.

We have learned one or two important facts, which may perhaps be profitably considered by those who are engaged in operations of this kind.

First.—The greatest desideratum, the end of the chief and first importance, *is to get a perfectly true, round well*; this secured, all other things are comparatively easy.

Second.—No single tool, whatever may be its shape, whether Z., H., or Star, will at one cutting make a true well; it will more than likely worm a hole in the earth like an auger or a cork-screw.

Our second well is as true as a gun barrel, and perfectly round. We have introduced a tool grab, sixteen feet in length, its diameter within less than one-quarter of an inch of the size of the well, and it descended six hundred and ninety feet in one minute by the watch, without a touch or a jar. This well was bored with a three and three-quarter inch chisel bit, sharpened to a knife edge, as sharp as it could be made and stand the force of the blow, (about 900 pounds raised two feet,) and then followed every three feet (the length of the bit) with a full five inch rimmer. This rimmer is of a peculiar construction, and we believe unlike any in use, and for the purpose intended, is a perfect tool; it has two three and a half inch faces, the outer edges of which are of course circular, conforming to the circumference of the well, and the tool is so made that bits of rock or stone falling into the well above the rimmer, will work down below it, and thus prevent the binding and fastening of the tools. This tool drives down a three-quarter inch shoulder, knocking the spawls into the centre already cut out by the bit, and makes a mechanically true round well.

The value of this latter fact will always be seen in cases of accidents to the tools. You can recover tools from a true well in ninety-nine cases out of a hundred, when in an imperfect well the reverse of the proposition would be true, and the well almost inevitably be lost.

Boring with rods is out of date, a thing of the past, yet there are persons who still persist in it; and such will spend one-half of the working hours in getting the tools out of the well and then putting them back. By all means use the rope, it is safe and expeditious. Beware of patent tools, cutters and drills, especially those "*which drill from thirty to one hundred feet per day in the hardest rock.*" The simple chisel bit and rimmer will do the work well, and as fast as it is wanted.

A well of five inches is better than one of four or four and a half, for it enables you to use stronger tools, and in case of accident it enables you to get around and hold them. Get the best Lowmoor iron jars; have them made good and strong, and never drill more than 300 feet with one pair. You should have three pairs for a well of 600 feet and over, and should have all of your tools in duplicate. Use a tin or a thin copper sand pump, and never permit an iron pump to be inserted in your well. You can drill the tin one out in an hour if it should get fast, but with an iron one you would probably lose the well.

THE PHILOSOPHY AND GEOLOGY OF UNDER GROUND STREAMS.

It is a well settled fact that a large portion of the water which falls upon the surface of the earth penetrates the soil and porous rocks, and becomes subterraneous. And there are also underground streams which are not the result of this law, but which have their rise in hills, mountains and elevated lands, and are fed by the rains and snows. Professor Dana says that these waters become underground streams by following the dip of tilted strata. The layers of limestone and sandstone never fit together so closely but that waters may find their way between them.

Many of these subterranean streams are of great size, quite

entitled to the name of rivers, as is witnessed in the Mammoth Cave in Kentucky, the Adelsburg Mountains in Austria, and in the Jura Mountains, in Switzerland, where the waters pour out of the sides of the hills, in quantities sufficient to turn the machinery of a mill.

Pervious strata beds of sand and gravel and sandstones frequently alternate with those which are impervious, such as limestones, granite, and beds of clay. Water finds its way through the pervious strata, descending until it rests upon the impervious rock, which becomes the bed of the stream; here it winds its way along, following the tilts and inclinations until it finally becomes, as it were, compressed between two impervious layers, and is similar in many respects to water in a pipe leading from a reservoir; there is neither current nor motion until the pipe is tapped, when it rushes to the surface, often with great force. Artesian wells are usually bored (and it has hitherto been considered necessary to success that the rule should be followed) in vallies or on plains surrounded by hills or elevated lands.

Theoretically water rises to the level of its fountain head, but practically it falls much short of it, owing to the friction and the resistance of the atmosphere, so that water which rises one hundred feet above the surface at its outlet, has a head or source much higher.

The water furnished by Artesian wells increases in temperature in proportion to the depth, so that taking the average of the known wells of the world, this increase has been proved to be 1° F., for every fifty-one feet of descent. Water is discharged by various wells from 65° to 95°, and this temperature is always below the mean of the location of the well. It is by this means that geologists determine the heat of the earth's crust, and can with a tolerable degree of accuracy fix the point at which the mass is liquid fire.

These are a few of the simple principles applicable to Artesian wells.

The boring of the two wells in Chicago has brought to light some new facts which I think have not been heretofore known, and which are at variance with supposed well settled principles.

The first of these facts, is, that Chicago, where these wells are located, is a plain or prairie, nearly level, and surrounded by a level country for many hundreds of miles; there is neither valley nor depression here, as there is neither hill nor mountain. Lake Superior, some three hundred miles distant, has a level of only thirty-nine feet above that of Lake Michigan, and there are no intervening highlands; there is simply a rolling prairie extending north into Wisconsin, and west into Iowa, while south for some two hundred miles, stretches the Grand Prairie of Illinois. About ten miles west of Chicago is a ridge called the "Summit," the elevation of which is about twenty-five feet above the level of Lake Michigan. This ridge divides the waters which empty into the St. Lawrence from those which flow into the Gulf of Mexico. On the western slope of this summit is the Desplaines River, a tributary of the Illinois, while the Chicago River flows from the eastern slope into Lake Michigan, and these waters through the St. Lawrence into the ocean.

As the water from these wells has a head of about one hundred and twenty-five feet above Lake Michigan, and eighty-six feet above Lake Superior, we must look to some more remote point for the head or true source of supply.

And here another consideration presents itself which may throw some light on the subject. When the water first came to the surface the temperature was nearly 59° F. After discharging some two hundred millions of gallons, the temperature has fallen to 57°, or about two degrees lower than when first struck. Now the fact that this water was found so much colder than the mean tem-

perature of Chicago at a depth of 700 feet, and that the temperature decreased with the descent of the drill, instead of increasing as had been the usual experience, presents an anomaly which geologists may profitably study. And then comes the fact still more strange that the temperature of the water is still falling—that the more it discharges the colder it gets. There is seemingly no solution of this problem but to locate the head or source of this water at some remote point in the mountains of the North or Northwest, some place where the mean temperature may be 57° or less, as there is a probability that the diminution in temperature may continue, and the continuous discharge at the outlet has drawn the water from nearer its fountain head and consequently much colder water is obtained now than when it first issued from the ground.

The fact of the low temperature of the water taken in connection with the head of one hundred and twenty-five feet, seems to point almost conclusively to its source in some of the distant mountains beyond the Mississippi; and these two facts also show that the wells are not supplied by the percolations of water through porous strata, finding its way to the depressions of a valley, but that it comes through the seams and crevices of the rocks, working its way for many hundreds of miles through the crust of the earth.

CONCERNING SPIRITUALISM.

Thus one by one the great facts in support of the Spiritual Philosophy accumulate; manifestations of the spirit power are now of daily occurrence, and tens of thousands of investigators are increasing the immense volume of testimony now on the record in proof of its truth. At no distant time it will be ranked among the positive philosophies. Its principles, at once simple and sub-

lime, commend themselves to the human heart, and its facts to the human reason. To those who come unprejudiced, and impartial to an investigation of its merits, there is no escape from its conclusions. Discarding the fables of antiquity, and shattering the fetters which bind the mind down to the slavery of the past, Spiritualism rises at once grandly and proudly to an exalted conception of creation; studying the Creator, not in the tales and traditions of the dark ages, but in the manifestations in the works of God which everywhere surround us.

As the geologist, the reader of the great stone book, unfolds its leaves and tells us of the millions of years of creation; of the gradual development of vegetable and animal life through thousands of centuries, and demonstrates its truth by pointing to the record which God has written in the rocks; so Spiritualism adopts what geology teaches, and casts aside the fabulous story of a special creation in a few days of time, preferring the more enlarged, more comprehensive, and more natural view of the work of God, to the purely mythical view resting only upon a fatherless tradition. The astronomer who maps the skies and exhibits to us the architecture of the heavens, exposing to the admiring gaze of man the countless millions of worlds and suns, of beauty the most transcendent, who, penetrating to the remotest depths of space reveals the existence of unnumbered orbs of light, of vast systems of stars, which can be likened only to the sands upon the seashore, also, bears witness to the falsity of another of the traditions of our childhood, viz: that which taught us to believe that this earth was the chief result of the creation; that the sun and moon and stars were made to give light for and to adorn, and beautify it, and that on this earth alone, was man, the sole recipient of the Divine Spirit, placed. Can it be that God has made the whole of this wondrous creation, these millions of worlds, and on this mere mote, amid the vast ocean, the earth, and on it alone, that

He has been pleased to locate the image of Himself? Astronomy answers, No. Spiritualism believes—nay, it knows—that intelligence, even like unto the Great Creator himself, is omnipresent; that all of these worlds are peopled, or are in the process of perfection to that state, which will eventually fit them for the habitation of intellectual beings. That intelligence is the culmination of creation, and is not confined to any one orb or sphere, but is universal, co-extensive with the stupendous works of God. Spiritualism is a liberalizing power, she takes science by the hand and bids her go on, unravel, investigate and develop the laws of nature, to expand the human intellect, and to learn what she can of the manifestations of God. Spiritualism does not meet the investigator as the Church met Capernicus and Galileo; she has no prison houses for the men of genius, for the leaders of the human race; she has no fear that scientific knowledge will contradict the sayings of some musty old saint, or the traditions current in the barbarous ages of the world, for she believes that God intended man should learn, should raise himself up, should exalt his moral and intellectual faculties to the highest possible standard. The truths of Nature, the revelations of the Divine are scattered throughout the universe; they are there for man to grasp and understand—like the peaks and ranges of the great mountains, we have no sooner compassed one but others higher and greater, rise in majesty and grandeur before us; and that in this order knowledge ever continues to progress until we reach even to the confines of the great Infinite mind.

Such is a glimpse of the Spiritual Philosophy. Wider fields and broader avenues are every day opening to the view, and at no remote day Spiritualism will demand and receive from the judgment of men its proper place among those philosophies, which are based upon and supported by indisputable facts.

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